

## Getting to the Heart of Black Holes with Carlo Rovelli



## Theoretical physicist (and author of "Seven Brief Lessons on Physics") at SISSA

26 October 2016, 4:30pm SISSA, Aula Magna Via Bonomea 265, Trieste

Carlo Rovelli, author of *Seven Brief Lessons on Physics*, the Italian literary sensation of 2015, and one of the founders of the "Quantum Loop Theory" of quantum gravity, will be the guest speaker at SISSA on October 26, 2016. In his talk, which is part of the SISSA Colloquia series, Rovelli will take viewers "Inside black holes" (also the title of his presentation). What have we learned this year from the extraordinary observation of gravitational waves? What other signs do we have about these fundamental yet elusive celestial bodies? How can we answer fundamental questions about physics and better understand our Universe by studying them? These are some of the questions he will answer. The talk, which will be held in English by Rovelli, is free and open to the public. No reservations. People attending the conference from outside SISSA are kindly advised to reach the School by Public Transportation.



Carlo Rovelli is a distinguished physicist. Along with Lee Smolin and Abhay Ashtekar, he founded the theory of Loop Quantum Gravity, now considered one of the most advanced theories of Quantum Gravity alongside String Theory. In fact, the discovery of Quantum Gravity theory can be compared to the discovery of the theory of relativity or quantum mechanics in the last century. He is most recognized, however, for his work as a writer. In 2015, his book, *Seven Brief Lessons on Physics*, was ranked second overall for sales in Italy (surpassing even the immensely popular Elena Ferrante). This publishing event ushered Physics into the top ten where normally fiction resides. The book, published by Adelphi, has been translated into 41 languages, and has received enthusiastic reviews in such publications as the British newspaper, The Guardian. Rovelli, who is also an expert in Philosophy and the History of Science, is a regular contributor (Science, Physics in particular) to the pages of *Il Corriere della Sera*, and, in the past, of *Il Sole 24 ore* and *La Repubblica*.

On October 26, Rovelli will be hosted by the International School for Advanced Studies (SISSA) in Trieste, where he will present a talk entitled: "Inside black holes." He will discuss the latest findings on black holes and the new frontiers in research starting with the observation of gravitational waves, which he calls "the most spectacular scientific results of this year." Gravitational Waves, in fact, "are the result of the merger of two black holes" and were observed for the first time only this year (after years of unsuccessful attempts), giving experimental confirmation of their existence.

The universe is full of black holes, notes Rovelli, and this observation proves it once again. While scientists are familiar with the outside and surfaces (the "horizon") of black holes, as described in detail through Einstein's Theory of General Relativity, they have not yet solved the mystery of their center or "heart," which is governed by quantum gravitational effects.

"Black holes are among the strangest and most fascinating objects ever seen in the universe, and may be the window for better observing and understanding quantum gravity, the unresolved issue at the heart of fundamental Physics," says Rovelli. The colloquium will be held at 4:30pm on Wednesday, October 26 in the Aula Magna at SISSA.

Short Biography



Carlo Rovelli has worked on the faculties of the University of Pittsburgh, the University of Rome, Syracuse University and Yale University. Currently, he is a professor at the Center for Theoretical Physics of Aix Marseille Université, in France, where he directs the Quantum Gravity Group. He is the author of over two hundred articles in scientific journals and books on physics. His research focuses on Quantum Gravity. In addition to being one of the founders of Loop Quantum Theory, in the 1990's he proposed The Thermal Time Hypothesis, where the dimension of time emerges only in thermodynamic or statistical contexts (for which time does not exist as a fundamental dimension of the Universe). In 1994, he also formulated the relational interpretation of quantum mechanics, which says that the quantum state of a system is to be interpreted relative to another system, just as the speed of an object in classical mechanics is established according to that of another object. Rovelli is an expert on the history and philosophy of Science and has written a book about the Greek philosopher, Anaximander. It was published in Italy, France and Brazil.

Besides his work as a scientist, Rovelli is a prolific writer and contributor to science journalism. He is the author of several popular books (besides the aforementioned *Seven Brief Lessons on Physics*), which have been translated into several languages.

## IMAGES:

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